IR Receiver for the I^2C Bus

045

A commonly encountered problem is that the code sent by an infrared transmitter cannot be evaluated by a microcontroller directly on being received, due to the fact that the microcontroller is busy with something else at the time or is simply too slow to sample the signal at a rate sufficient to achieve an error-tolerant evaluation. In such cases, a helpful solution is to use a Philips SAA3049 infrared television decoder, which is still available as an NOS (new old stock) item although it is no longer being manufactured.

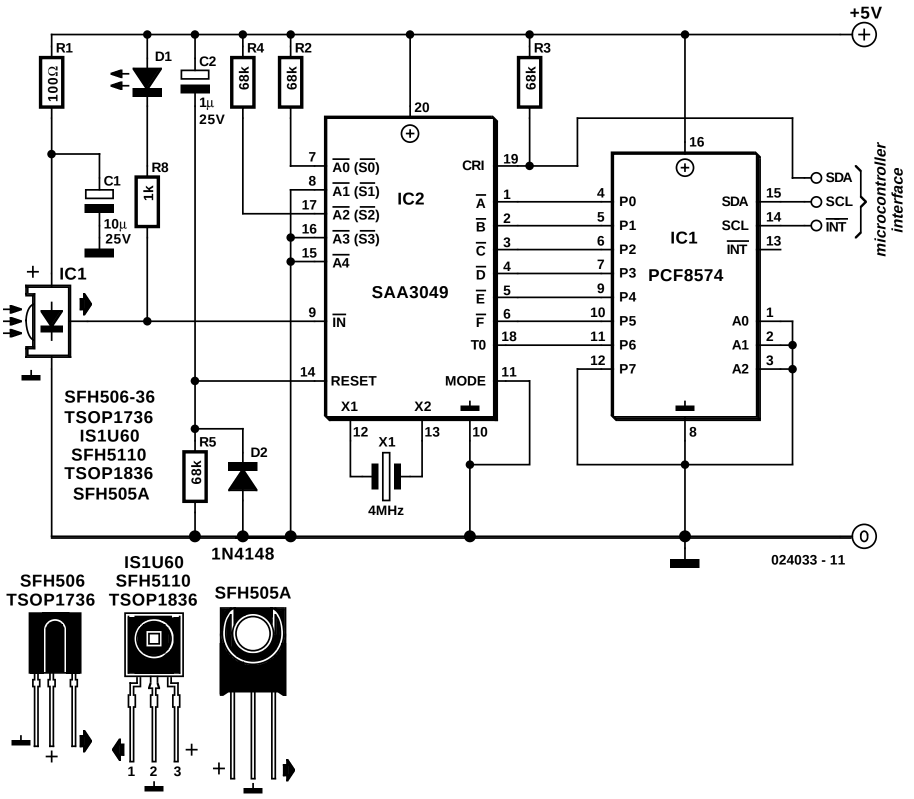
The SAA3049 is microcontroller-based and performs all the tasks necessary to decode an infrared signal in RC5 or RECS80 format. The transmitted command is available in binary form at the output pins (1–6) for further processing by a second microcontroller. If the second microcontroller has enough input pins to read in six bits plus the toggle bit in parallel, no further circuitry is needed. If the second microcontroller is short of port pins, which is usually the case, the signals must be converted to a different form. One possibility is to use a component that converts the command data into an I^2C-compatible format and outputs the result via the SDA and SCL bus lines on request.

Philips Semiconductors offer a port expander (type designation PCF8574) with eight programmable input/output pins. All communications and programming take place via the I^2C bus. With the circuit described here, the command data and toggle bit of an RC5 code set to system address 5 can be read serially by a microcontroller using only three port pins.

The address to which the IC should respond during bus communications is set using A0, A1 and A2. In this circuit, all of these pins are tied to ground, which means that the address is set to (40h + 0) = 40h. Although each change of signal level on pins P0–P7 triggers an interrupt and thereby causes the signal level on the INT pin to change from High to Low, in order to notify the following microcontroller that new data are available, it is unfortunately necessary to clear this signal by performing a data transfer on the bus before it can again be activated. This means that there is a risk of losing an interrupt pulse if it occurs during the Acknowledge clock.

Information regarding the timing for the I^2C bus and the detailed programming of the PCF8574 can be obtained from the device data sheet available on the Philips website.

(024033-1)



System address	Device
0	TV 1
1	TV 2
2	Videotext
3	Expansion for TV 1 and TV 2
4	Laser Vision Player
5	Video cassette recorder 1 (VCR 1)
6	Video cassette recorder 2 (VCR 2)
7	Reserved
8	AT 1
9	Expansion for VCR 1 and VC R2
10	SAT 2
11	Reserved
12	CD-Video
13	Reserved
14	CD-Photo
15	Reserved
16	Audio preamplifier 1
17	Tuner
18	Analogue cassette recorder
19	Audio preamplifier 2
20	CD
21	Audio rack or recording device
22	Audio satellite receiver
23	DCC recorder
24	Reserved
25	Reserved
26	Writable CD
27–31	Reserved